

WPS 1244

POLICY RESEARCH WORKING PAPER

1244

Difficulties of Transferring Risk-Based Capital Requirements to Developing Countries

Edward J. Kane

Regulatory strategies that make sense for industrial countries may not be transferable, unchanged, to developing countries. But developing countries could clearly benefit from reformed supervisory technology, including improved information collection and management.

The World Bank
Policy Research Department
Finance and Private Sector Development Division
January 1994



Summary findings

In principle, financial regulation seeks to remedy recognized deficiencies and inefficiencies in a nation's economic, political, and bureaucratic incentive structures. But the social urgency of particular financial policy problems differ according to a country's stage of development. Regulatory strategies that make sense for industrial countries are unlikely to work the same way in developing countries.

Kane examines opportunities for transferring the framework of risk-based capital requirements negotiated by the G-10 countries under the auspices of the Bank for International Settlements in Basle. He finds that an unchanged transfer of the Basle framework to developing countries is economically inappropriate and politically infeasible. And its voluntary adaptation is difficult because the long-run economic appropriateness of the

Basle framework of solvency regulations directly opposes their short-run political embraceability.

Kane believes that what most urgently need to be transferred to developing countries are elements of supervisory technology: methods of information collection and management, legal processes for prompt and equitable default resolution, and mechanisms for controlling the incentive conflicts that lead bankers and government supervisors to resist the healthy exit or recapitalization of damaged institutions.

As a first step, Kane recommends that the World Bank and the Bank for International Settlements promote economically beneficial reforms in information collection and management, reforms that do not preclude flexibility in current prudential standards in individual countries.

This paper—a product of the Finance and Private Sector Development Division, Policy Research Department—is part of a larger effort in the department to study developing country financial regulations. The study was funded by the Bank's Research Support Budget under the research project "Risk-Weighted Capital Adequacy Requirements: An Application to Developing Country Banks," (RPO 677-41). Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Paulina Sintim-Aboagye, room N9-059, extension 38526 (28 pages). January 1994.

The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be used and cited accordingly. The findings, interpretations, and conclusions are the authors' own and should not be attributed to the World Bank, its Executive Board of Directors, or any of its member countries.

Difficulties of Transferring Risk-Based Capital Requirement to Developing Countries

by
Edward J. Kane*

DIFFICULTIES OF TRANSFERRING RISK-BASED CAPITAL REQUIREMENTS TO DEVELOPING COUNTRIES*

Edward J. Kane
Boston College

In principle, financial regulation seeks to remedy recognized deficiencies and inefficiencies in a nation's economic, political, and bureaucratic incentive structures. Because the social urgency of particular financial policy problems differs according to a country's state of development, regulatory strategies that make sense for developed countries are unlikely to work in the same ways in various different developing-country contexts.

Keeping this idea in the forefront, this paper examines opportunities for transferring the framework of risk-based capital requirements that was negotiated by the G-10 countries under the auspices of the Bank for International Settlements in Basle. The analysis finds that an unadapted transfer of the Basle framework is economically inappropriate and politically infeasible. At the same time, voluntary adaptation is difficult because the long-run economic appropriateness and short-run political embracability of hypothetical adaptations in the Basle framework of solvency regulation stand in direct opposition to each other.

The author believes that the elements of supervisory technology that most desperately need to be transferred to developing countries are methods of information collection and management, legal processes for prompt and equitable default resolution, and mechanisms for controlling the incentive conflicts that lead bankers and government supervisors to resist the healthy exit or recapitalization of damaged institutions. As a first step, the paper recommends that the World Bank and Bank for International Settlements (BIS) promote economically beneficial reforms in information collection and management that do not in themselves preclude flexibility in the prudential standards that hold sway in individual countries.

* The author is the James F. Cleary Professor in Finance at Boston College. He wishes to thank the World Bank for financial support and Herb Baer, Gerald Caprio, Asli Demirgüç-Kunt, Robert Eisenbeis, David Scott, Andrew Sheng, Joseph F. Sinkey, Jr., and Dimitri Vittas for valuable comments on an earlier draft.

L. Problems of Adapting the G-10 Pattern of Solvency Regulation to Developing Countries

For G-10 countries, the 1988 Basle agreement served two purposes: prescribing limits on beggar-thy-neighbor opportunities for slackening bank supervision as a means of promoting the export of financial services to other countries and improving the efficiency of prudential bank regulation on a global basis. Obviously, promoting financial-services exports is a relevant issue only for countries whose institutions compete credibly for foreign customers in the global financial marketplace.

The G-10 agreement symbolizes the ostensible disdain that authorities in the financially most-developed nations of the world have for policies that seek to use lax banking regulation as a device for winning financial trade from other countries. However, in developing countries, lax prudential banking regulation serves other sectors and much broader policy purposes (Eisenbeis, 1992). These other interests must be identified and addressed on a country-by-country basis if leaders of these countries are to be expected to accept outside restraint on their ability to use bank solvency policy to control the amount or distribution of credit.

As a scheme for increasing global regulatory efficiency, the Basle agreement embodies two thrusts. It erects a shared rule-based framework for currently measuring and enforcing individual-bank solvency and it pledges signatory governments to a long-run evolutionary task of improving their bank solvency standards.

The current framework prescribes that calculations of bank risk exposure recognize the effect of various off-balance-sheet positions and requires that risk weights be developed to categorize differences in estimated credit risk across broad asset categories. Evolutionary goals envisioned for the system include the incorporation of other types of risk, particularly interest-rate and sectoral credit-concentration risk.

Currently, the Basle framework sets minimum ratios for stockholder equity and total capital, respectively, at four and eight percent of a bank's risk-weighted credit-risk exposure. But the pact's exclusive focus on credit risk and purportedly common standards for measuring bank capital allow considerable leeway for individual countries in how risk, capital, and supervisory standards may be interpreted and implemented (Hall, 1990). Although a source of current regulatory enfeeblement, these implementational loopholes are envisioned as agreement-promoting sweeteners meant to ease the transition

for individual G-10 countries to common and comprehensive rules and then fade away over time.

Trying to adapt the Basle framework and pledge to the service of developing countries poses a hard dilemma. On the one hand, to establish commensurate levels of safety between banks in G-10 and developing countries, minimum ratios for bank capital would realistically have to be tied to inverse measures of the completeness of a country's financial infrastructure and the perceived stability of its financial, macroeconomic, and political environments. On the other hand, to win the acceptance of leaders of developing countries, the risk-based framework and evolutionary pledge would have to offer considerable flexibility. In particular, authorities in most of these countries would want to preserve their discretion to relax effective capital standards when their economies or banks became weak.

The political environments of most developing countries subordinate bank supervision to monetary-policy goals. Leaders typically prefer to be able to relax supervisory priorities as necessary to serve these larger goals. This preference assigns a low value to year-to-year continuity in bank supervision. Any short-run threat to a government's survival, whether from scandal or adverse macroeconomic events, is apt to persuade its leaders to de-emphasize long-run plans for improving bank supervision.

While policy instability probably narrows with financial development, it represents a universal feature of modern nation states. Even in developed countries, authorities prove all too comfortable with imposing delayed but long-lasting costs on strong banks and general taxpayers to generate quick-developing but transient benefits for targeted sectors. Administrative discretion to downgrade the importance of prudential supervision and to install ad hoc systems for influencing the sectoral allocation of deposit-institution credit has been repeatedly exercised in the U.S. One need look no farther than the Clinton Administration's promotion of "community development banks" and its efforts to respond stubborn macroeconomic weaknesses by taking steps to help small business to deal with the politically convenient scapegoat of a bank-led "credit crunch."

It is hard to imagine how the international community could exercise enough discipline to make it likely that long-term financial-regulation commitments made by fading or discredited governments would be upheld in the face of strong political

counterincentives. Acknowledging the inescapability of systematic political overrides, this paper does not try to establish how the level and structure of bank capital requirements should vary ideally across nations with different financial and macroeconomic milieus. Rather, the paper seeks to clarify the urgency of reshaping the informational infrastructure of financial institutions in developing countries so as to improve and standardize the methods used to measure capital and risk exposure at commercial banks.

The analysis presumes that the difficulty of monitoring and policing bank solvency and enforcing a rational exit policy increases as a nation's financial infrastructure becomes more rudimentary and/or more nationalized (Polizatto, 1990; Scott, 1992). In developing and former Socialist countries, the worth of individual assets and liabilities cannot be tracked with great precision. Poor information systems, extensive government ownership, thin financial markets, and shortages of supervisory skills make banks especially hard to value. Information gaps and the concentrations in export earnings expose stakeholders in developing-country banks to difficult-to-hedge adverse economic shocks. At the same time, the regulatory and supervisory skills needed to monitor and police bank risk taking are hard for these countries to develop and retain.

These difficulties limit how much the world regulatory community can reasonably expect risk-based capital requirements to achieve in developing countries. They create a need to constrain --rather than piously striving to eliminate-- variation across countries in how to measure risk and capital and in how to deal with weakness in bank capital when it arises. As a first step, the World Bank and BIS can reasonably exert such constraint by designing and promoting the transfer of prototype information systems for bank record-keeping and credit analysis. Its staff must expressly adapt and stratify different information systems for differentiated supervisory use in countries whose financial markets and institutions qualify as logically distinct financial environments.

Recognizing that policy frameworks will never completely converge highlights the advantages of assuring that, within limits that are set inescapably by observational difficulty, bank risk-taking and capital positions are transparent enough in all countries to be monitored and disciplined by stockholders, customers, regulators, and taxpayers. Implicitly or explicitly, the organization of bank supervision in any country may be divided into two parts. First, regulators establish incentives that seek to encourage banks

to hold sufficient capital to support their overall loss exposure. Second, the suppliers (i.e., owners) of whatever mix of private and governmental capital each bank actually deploys look for information with which to monitor the loss exposure their stake in the bank passes through to them. In developed and developing countries alike, the great danger is that taxpayer stakes in explicitly and implicitly nationalized banks remain at least partly hidden from view. Defects in the incentive systems governing public service are supported by blockages in the flow of information on the quality of job performance. In any country where the private monitoring sector of the financial infrastructure is weak or nonexistent, regulatory performance can be improved by an inflow of skilled resources into independent private auditing and credit-rating industries.

The fact of countercyclical and idiosyncratic fluctuations in a society's political willingness to enforce restrictions on the deal-making opportunities of its banks calls for lawyers, accountants, and economists to develop information, contracting, and regulatory technologies that can permit capital standards to be tightened or relaxed over the business cycle in an economically efficient manner. In practice, supervisory efforts often offset rather than reinforce the market pressures that would ordinarily discipline the risks to which bank lending, funding, and other business strategies expose various stakeholders. Brock concludes from surveying banking policy in Latin American countries (1992, p. xiii) that "government shielding of banks from the hazards ... and influence of the free market fosters unsound, crisis-prone banking systems."

Government supervisory mechanisms that are intended to assure prompt corrective action from economically insolvent banks cannot be stopped from responding to political and macroeconomic pressure. Nevertheless, economic efficiency would be served if governments would commit to fostering unbiased and nonsecretive measurement of private and governmental contributions to bank capital. If informationally disadvantaged bank stakeholders are to be protected throughout the globe, individual country banks must be monitored and disciplined by reliable parties who can make it difficult for politicians and regulators to renege surreptitiously on their commitment to informational adequacy and transparency.

II. Measuring Bank Capital

Repetition of regulatory-policy jargon tends to anesthetize observers to the need to explore nuances in the meaning of the economic concepts that stand at the heart of policy discussions. Each of the four words featured in the term "risk-based capital requirements" is conceptually much less straightforward than it appears at first blush.

Everyone agrees that a bank's capital position is a measure of net worth: the value of its assets net of appropriate liabilities. However, great differences exist both about how individual assets and liabilities should be valued and about which of a bank's individual positions and commitments should be itemized and netted against each other.

Similarly, everyone agrees that risk refers to the chance that a bank may encounter bad future outcomes. Good and bad outcomes emerge as the net effect of variation in customer loan default experience, in bank liquidity needs, in relative interest rates, in employee fraud, in operative regulatory and tax frameworks, in the price of foreign exchange, and in other systemic forces. Financial analysts frequently disagree about whether the chance of some bad outcomes is either adequately hedged or small enough to be neglected. Moreover, what is bad or good may vary with the horizon over which a bank's performance is to be evaluated. Even ex ante, investments that look wonderful in the short run may look disadvantageous in the long run, and vice versa.

In addition, framing the policy task as if it were one of developing a set of reasonable capital requirements adopts a dangerous simplification. Promulgating a set of supervisory standards is only half of the task, in that standards do not of themselves bind regulatee behavior. Supplementary action must be taken to motivate regulators to implement --and banks to meet-- the balance-sheet targets promulgated standards embody. In practice, only enforcement procedures can fulfill this additional function. Adequate penalties must be defined and these penalties must be promptly and predictably enforced.

Finally, the operative policy question is not whether it is prudent for supervisors to base bank capital standards on risk. The desirability of this connection goes without saying. The problem lies in finding a risk-weighting formula that covers all relevant types of risk and balances the costs and benefits the policy generates for regulatees. Conscientious policymakers must recognize that, to balance benefits and costs through time, the risk-weighting framework must be adaptive enough to respond to change in

expectations and to evolve with financial technology and the larger economic environment.

Bank Capital as a Financial Stake Being Placed at Risk by Less-Protected Parties

Modern corporate finance views a firm as an aggregate of explicit and implicit contracts that collectively assign various claimants a prospective "stake" in the cash flows a firm's assets generate. Although individual stakes can be positive or negative, the market value of all stakes must sum to the market value of the assets. A bank's principal stakeholders include: stockholders; managers and other employees; established borrowers; depositors; nondeposit creditors; and (through the explicit or implicit government guarantees other stakeholders may enjoy) taxpayers.

The value of each stakeholder's claim may be conceived as the present discounted value of the returns that claimholder may reasonably project will develop in the future. Stakeholders command risk premiums for whatever risks the market perceives to inhere in their positions. Hence, the riskier its projected cash flows, the more severe the discount rate to which a stakeholder's anticipated returns are subject.

To assess a claim's riskiness, it is instructive to array bank stakeholders in two related ways: (1) in terms of their ability to force liquidation and the priority or "seniority" their claims receive in the event the bank is liquidated, or (2) in terms of stakeholders' access to "inside" (i.e., nonpublic) information about the bank's future prospects. Accountants, economists, regulators, and financial analysts all interpret a bank's "capital" to measure the net assets that a designated group of potentially junior or inside stakeholders stand to lose before future losses begin to reach senior or outside stakeholders.

Bank capital is meant to act as a "shock absorber" for claimholders whose stakes are positioned up the line in a loss-absorption chain of financial dominoes. Writing the funding contracts that determine where stakeholders stand in this chain can be likened to spacing these dominoes. The first few dominoes in the array are typically placed close together. These dominoes are apt to wobble whenever the value of bank earnings or assets is bumped unfavorably. On the other hand, the last few dominoes stand fairly far apart. They are likely to be jarred only by shocks that are truly severe.

In the simplest funding structure, bank capital consists of the value of every dollar (or other currency unit) of owner equity that stands in front of depositor claims. Whether

they face simple or complicated funding structures, depositors and their guarantors need to defend their hoped-for isolation from probable loss. This is done efficiently --not by setting high initial capital requirements-- but by making sure that the stakes of lower-priority stakeholders are rebuilt promptly whenever they decline in value. This means monitoring the value of lesser-priority stakes and pressuring bank managements either to rebuild or to surrender these positions when and as adverse developments compromise them.

Measuring the sensitivity of insider stakes to the asset and liability writedowns that might be implied by changing conditions is the operational problem that bank supervisors face under the risk-based capital framework. To address this problem, supervisors must promote adequacy and transparency in bank record keeping.

For credit policy and loan evaluation, this means installing documentation requirements that mandate establishing adequate provisions for loan losses and explicit files for each of the traditional five C's of credit analysis: cash-flow projections, collateral, character evaluation, vulnerability to changing economic conditions, and borrower capital strength.

Explicit and implicit government guarantees of borrower performance are collateral-like "credit enhancements." Especially in developing countries, it is important to separate the value of formal and conjectural guarantees a bank receives from the stand-alone value of loans it makes to state-owned enterprises and members of governmentally favored economic sectors.

In any developing country, improving the quality of bank information systems needs to be made a high-ranking objective of prudential regulation. In more than a few countries, loan-loss provisioning has been ignored and several of the hypothetical "five C" file folders that constitute appropriate credit files have been left empty. In these countries, setting a nominal 10-percent or 20-percent capital requirement will do less to stabilize the banking sector than adopting a conscientious program for building databases at individual banks that are capable of enhancing capital measurement and enforcement over time. However deficient a developing nation's ballpoint-pen and carbon-paper information system may be at the start, its authorities should be urged to throw off limitations on their capacity for measuring bank capital and risk exposure and to ensure

that their information base and valuation technology improve over time at a reasonable speed.

Difficulties of Recognizing and Measuring the Government's Contribution to Bank Capital in Developing Countries

Even in G-10 countries, depositors enjoy implicit and explicit government guarantees of repayment. Typically, the user charges that banks pay for these credit enhancements fail to capture the full value of at least the implicit or conjectural portion of the guarantees they enjoy.

Economic analysis conceives of the capitalized value of underpriced government guarantees as a taxpayer contribution to bank capital (Kane, 1985). For banks in developing countries, the ratio of government capital to private capital often equals or approaches 100 percent. Sometimes (as in Eastern Europe) bank nationalization comes about as a matter of ideology. In other cases, it develops informally as formerly private institutions are left open after they have become economically insolvent on a stand-alone basis. The ability of institutions that lack enterprise-contributed net worth to service their depositors comes from a widespread understanding that the government has spread a "safety net" that puts taxpayers' credit in place of funds provided by the bank's nominal owners.

Managerial and regulatory incentives differ greatly between private and government-owned banks. Whether a country's banks are nationalized de jure or merely de facto, the condition of effective government ownership lessens the prudential benefits society receives from risk-based capital requirements. This occurs for two reasons. First, with respect to risk-taking the interests of top government regulators and the least-secured private stakeholders in a government bank tend to converge rather than diverge. Second, taxpayers are seldom able to monitor the use made of their stake in a bank as effectively as private stockholders and bondholders can.

Whether and how well risk-based capital requirements help taxpayers to monitor their stake in a country's banks depends on how well and how frequently the information system measures taxpayer stakes and bank risk taking for them. Hence, for government-owned and private banks alike, weaknesses in information and valuation technologies stand as major obstacles to better prudential regulation.

Itemization Issues

An asset is anything that produces prospective positive cash flows and a liability is any claim that serves to fund the value of one's asset holdings. A corporation's balance sheet records its assets as positive items and enters liabilities with a negative sign.

Economic concepts of bank capital look to capture the capitalized value of all sources and uses of funds. In effect, economists present net worth as an estimate of the stock-market value of owning the firm.

In the U.S., the capital concept embodied in accountants' Generally Accepted Accounting Principles (GAAP) employs a more-selective itemization scheme. Except when they are asked to account for the price one corporation pays to purchase control of another, accountants itemize only what they call "tangible" items.

A tangible asset is something that can in principle be bought and sold separately from the particular enterprise which happens to employ it at the moment. An intangible asset is an asset that has value only when it is deployed in combination with other tangible assets (as, e.g., the loyalty of a firm's customer base) or is a right conferred on the owner by a government (as, e.g., a patent) or other corporation (as, e.g., a leasehold or patent license). Intangible assets include "going-concern values" that allow the collection of intangible assets that a firm manages to earn a higher return in a given enterprise than these assets could earn if they were redeployed to their next-best use.

Elements of the accounting concept of intangible "goodwill" may be recorded in footnotes in the U.S., but goodwill may only be booked into a firm's balance sheet when it is necessary to account for a firm's purchase price. Goodwill is a residual accounting item that serves to reconcile the GAAP concept of net worth on the date of a corporate acquisition or merger with the economic concept of the market value (i.e., the purchase price) of the corporation. In purchase accounting, GAAP net worth has two components. The first component consists of the liquidation value of the net tangible assets of the target firm. Goodwill is conceived as the additional value the firm is able to promise as a going concern. In turn, a firm's going-concern value is presumed to come from having accumulated a skilled staff and favorable reputation and having deployed the firm's assets in products and locations that are mutually adapted to the wants of a loyal customer base.

Accounting goodwill measures intangible net worth. It represents the capitalized value of putative sources of value that GAAP ordinarily neglects. Goodwill values the

firm's ability to earn above-market returns on the tangible positions shown in its tangible balance sheet. In principle, financial economists seek to partition a corporation's intangible net worth into three time-related portions:

- a) the value of "identifiable" intangible assets such as a corporate reputation, staff, business locations, and a customer base whose value is built up from wise expenditures made in the past;
- b) the capitalized value of ongoing net regulatory subsidies or burdens that flow from existing and projected laws and supervisory practices;
- c) the present value of growth opportunities (PVGO), which varies according to strategic adaptations and innovations that the corporation might make in the future.

Stock market values or takeover bids that diverge greatly from book values of tangible net worth make U.S. regulators uncomfortable. However, when U.S. regulators choose to give accounting relief to troubled institutions, they typically do so by selectively authorizing these institutions to record the values of specific categories of intangible assets. For example, in 1982 federal regulators authorized beleaguered thrift institutions to take into their balance sheets appraisal-based estimates of the extent to which their office buildings had appreciated above their book value.

A skeptical attitude toward intangible net worth is embodied in the itemization rules established by the Basle agreement. To the extent that intangible sources of net worth are recognized, such items are classified as "secondary" rather than "primary" capital.

Downplaying intangible net worth is traditional among Western European regulators, who have long preferred that their banks maintain off-balance-sheet sources of strength. But it is doubtful that East European and developing countries can afford to neglect intangible items. The desirability of assuring that intangible positions are valued fairly around the world should lead the World Bank to conduct research aimed at identifying reliable procedures for valuing intangible bank assets in different financial environments.

Valuation Issues

In different countries, professional accounting standards boards are free to authorize different valuation principles. For U.S. deposit institutions, GAAP balance

sheets develop item values from their historical cost. Items are carried at historical cost except in two cases: (1) when it is decided to reserve against a "reasonably anticipated" loss and (2) when an amortization account is established to reduce an item's book value according to a specified schedule of decline (e.g., to reflect depreciation).

Economists seek to measure an asset's current value and liken attempts to rely on historical-cost measures of bank performance to trying to steer a car by monitoring the car's progress through its rearview mirror. To economists, an asset's value comes not from what was once paid to acquire it, but from its present-day ability to generate future income.

Current values may either be observed or estimated. Current value is treated as indirectly observable whenever the price of identical or closely comparable substitute assets trade in active public markets. However, when comparability to traded assets is imperfect or the observability of some dimensions of the price paid is impaired, appraisers and economists need to check market-based judgments against calculations of the present discounted value (PDV) of reasonable projections of the asset's future returns. In principle, the interest rate employed in the discounting process increases both with the variability of the asset's objective returns and with the shakiness of the subjective assumptions on which projections must be founded. In practice, conscientious analysts experiment with a range of alternative return projections and discount rates with the aim of developing high and low estimates that may be confidently said to bracket an asset's true PDV. Because the process of making and discounting projections leaves potential room for dishonestly manipulating hypothetical item values, economists regard adjusted market values as a more precise and reliable touchstone than PDV.

Constraining Regulator Arbitrariness

Although constrained to some extent by international agreements, financial regulators in different countries and different regulatory agencies are free to adopt whatever itemization rules and blend of historical-cost and current-value approaches happens to serve their immediate policy purposes. The World Bank or BIS can make these policy choices less inefficient by forging and promulgating market-disciplined standards for capital measurement and risk assessment. The procedures outlined in the following sections are reproducible, model-based, and designed both to confront and to lessen the data limitations that are known to exist in developing countries.

If promulgated for universal use, these procedures need not themselves place a country's policymakers at an impossible disadvantage. This is because the disciplinary use to be made of the resulting measures would still be left to the discretion of local policymakers. Whether authorities in a given country want to enforce high or low ratios of risk-adjusted capital, taxpayers are bound to be exploited if regulators are prevented from challenging weak banks' efforts to overstate their capital strength and understate their risks.

III: Confronting the Need for Better Information Systems for Measuring Bank Risk

Banks are institutions that earn income by servicing the financial wants of their customer base. Among customer wants is a desire to transfer risk from themselves to financial-services firms. This want is important enough that a major portion of the net income earned by most banks consists of rewards they accrue in exchange for relieving their customers of "calculated" risks. A bank's ability to earn profits from risk-taking turns on its managers being able to understand the risks that attach to the deals they accept and to extract a reasonable return for bearing these risks.

It is either unrealistic or a sign of poor management for bankers to argue that the opportunity-cost value of their institution's capital is essentially unknowable. Whether a bank is evaluating an existing position or a new lending or funding opportunity, its managers must assess and price the associated risk fairly. Good management begins with establishing a system that can generate the information needed to track at least the broad magnitude of the corporate accounts that is asked to control. What differs across countries is how reliably a conscientious inside or outside analyst may estimate the distance between upper and lower bounds on reasonable estimates of the value of bank capital (Berger, King, and O'Brien, 1991).

In developing societies, economic information and analysis are scarcer than they are in developed countries. This scarcity increases the expense of generating upper, lower, and baseline projections of most would-be borrowers' economic prospects and decreases the reliability of whatever projections are made. Differences in the costs of compiling and analyzing relevant information help to explain why corporate reliance on ownership equity and use of financial intermediaries tends to be high in information-poor

economies, while information-rich societies experience expanding use of patterns of direct finance (Mayer, 1993; Demirgüç-Kunt and Huizenga, 1993).

While acknowledging that dramatic growth has occurred in the ways that a modern bank can expose itself to risk, Corrigan (1992) opines that: "...almost without exception, the most serious banking problems encountered in recent years have grown out of old-fashioned difficulties with bad loans and excessive concentrations." (pp. 5-6) Except that it has yet to deal with concentration and governmental default risk, the Basle Agreement is based on this presumption. It seeks to align a bank's capital with its exposure to nongovernmental credit risk. A unit risk weight is assigned to the loans a bank makes to businesses and consumers. "Credit conversion factors" are employed to translate off-balance-sheet positions (e.g., debt guarantees and forward commitments) into loan-equivalent investments. In fashioning both the conversion factors and the weights assigned other on-balance-sheet assets, the unit weight assigned to bank loans serves as the linchpin of the risk-evaluation system. Fractional weights or conversion factors of zero, twenty, or fifty percent are assigned to other portfolio positions. Because this approach ignores potentially important variation within each risk class, each factor and weight is best conceived as expressing the extent to which the particular activity suffers on average from default risk.

Default risk is the danger that the money a bank loans out will not be returned with interest as promised. For private and governmental borrowers alike, payment schedules must be established so that borrower performance can be tracked explicitly. Categories of nonperformance for loan contracts range from delays that leave payments in arrears through payments that prove late enough to be classified as formally delinquent to events of de facto default. It is not wise to permit payments to be booked routinely from prepaid interest reserves or open credit lines. This obscures information that in any well-managed bank could play an important role in designating loans for inclusion on its early warning watchlist. Any delay in the flow of promised payments entails opportunity losses for a bank and raises the possibility that the borrower is in fact taking a first step on the road to a partial or complete default.

In the U.S., privately supplied software for analyzing bank loans and other kinds of counterparty risk is an important managerial innovation whose applications are expanding and whose use in consumer, mortgage, and even commercial lending use is

spreading rapidly. Treating Corrigan's assertion about "banking problems" as a scientific hypothesis about bank risk that is applicable to developing countries implies that initial efforts to transfer risk-based capital standards to developing countries ought to concentrate on using existing U.S. credit-analysis and database software as a paradigm for improving the information and credit-analysis systems used in developing economies.

Credit-Application Files As a Database

To qualify for a bank loan, every would-be borrower must provide enough information on its affairs and prospects to convince the bank that it is prudent to advance the funds requested. Bank credit analysis turns on an assessment of the traditional "five Cs" of creditworthiness: character, capacity (or cash flow), capital, collateral, and conditional economic invulnerability (Sinkey, 1992, p. 515). Any bank's loan application form can be regarded as a questionnaire that seeks to extract information on these attributes. Analysis of this information by bank credit experts looks to assign a risk-rating to the various deals that customers offer.

"Character" is a subjective variable that summarizes a borrower's reputation for probity and fair play. Lenders prefer to deal with honorable parties who are determined to live up to their obligations if they possibly can. Bank files on character begin with the information that each applicant supplies on its credit history. Borrower honesty is assessed by testing this information against credit-bureau and other data-service files and by cross-checking other falsifiable facts with suppliers, customers, and other lenders. Additional evidence is sometimes collected by asking around about the firm's reputation in the communities and markets in which it operates.

Double-checking applicant-supplied information is an important test of character. This is why it would be useful for the World Bank or BIS to help developing countries establish or strengthen the presence or competence of private credit bureaus and credit rating agencies. Because government as well as private debt needs to be rated in these countries, it would also be beneficial to seek ways to insulate the work of credit-information agencies from political influence.

The other four "C's" focus on the borrower's ability to pay. They seek to clarify how funds to repay the loan can be generated. Data for analyzing a business firm's capacity and potential vulnerability to changes in economic conditions are collected in the form of business plans and from questions that focus on management skills and

experience. This part of the loan file describes the company's markets, customers, suppliers, competitors, and depth of management. The purpose of collecting this information is to establish whether the borrower can use the loan proceeds productively. The database includes the firm's past income statements and tax returns. It also should contain the firm's formal projections of cash flow, earnings, interest, and taxes.

Capital measures the value of resources from which a borrower might still repay the loan even if the project being financed works out poorly. A borrower's capital is measured in the same way as a bank's own capital. Data for calculating capital come from business balance sheets and supplementary data on value of relevant intangible assets.

Collateral represents supplementary ways to enhance a borrower's credit so as to qualify the loan for a more favorable interest rate. Lenders look for outside guarantors and for assets whose title can be pledged to the lender to curtail the banks' exposure to loss if the borrower should fail to deliver the stream of repayments promised.

Expert Systems for Credit Analysis

The object of credit analysis is to determine the odds that a particular loan will go bad. The information-processing activity of seasoned credit professionals or "experts" can be likened to an artificial intelligence system (Singleton and Surkan, 1991).

Expert systems for credit analysis seek to objectify and automate routine parts of the process of assigning and aggregating bond-issuer or customer scores for the five Cs of creditworthiness. The goal is to approximate the probability-formation process that experts go through in trying to assess the financial condition and stability of potential borrowers. This means positing n proxy variables that can be interpreted as theoretically relevant credit attributes (A_j , $j=1, \dots, n$) and incorporating these variables into a statistical model of the probability of default for a given loan to the k^{th} borrower, P_k . The various attributes that characterize a given borrower (say, the k^{th} customer) come from reported facts and estimated economic exposures.

The specific value the j^{th} attribute takes on for bank borrower k can be denoted by A_{jk} . The A_j include economic, financial and personal variables: loan terms; borrower characteristics; applicable economic conditions; and legal constraints the bank may face (e.g., on their ability to foreclose against loan collateral).

Specific attributes that are widely used in mortgage lending include: the loan-to-value ratio; the borrower's delinquency record; the borrower's occupation; the number of dependents in the borrower's family; and the ratio of the mortgage payments to family income. In the U.S. the Equal Credit Opportunity Act prevents many personal attributes from being legally used in such models. In particular, neither gender, national origin, race, religion, marital status, nor receipt of public assistance may be used in credit decisions.

Specific attributes useful in scoring business loans or corporate bonds include industry and macroeconomic trends and income and balance-sheet information such as leverage, interest coverage, return on equity, and earnings volatility. Zeller (1993) discusses opportunities for linking business credit-scoring models to larger models of macroeconomic and industrial activity.

In practice, to prevent estimated default probabilities from rising above unity or falling below one, credit scoring models must be nonlinear. However, the following linear form provides a convenient way to illustrate these models' logical flow:

$$P_k = a_0 + \sum_{j=1}^n a_j A_{jk} + u_{kj}.$$

Using this model, the coefficients a_j may be interpreted as marginal risk coming from attribute j and the value P_k provides a direct measure of the per-dollar risk weight the bank's capital would face in making the loan. The focus of credit scoring is to predict statistically the likelihood that specific customers will prove "slow-paying," "delinquent," or "pass into formal default." In the finance literature, statistical research has been used to derive and validate the attributes included in models for different types of loans (e.g., Altman, *et al.*, 1981; Boyes, Hoffman, and Low, 1989; Chesser, 1974; and Chhikara, 1989).

To adapt one or more of the models validated in this literature to the context of an individual bank and country, countries may be divided into three broad classes. Analysts must begin by ascertaining whether loan officers routinely collect information on the attributes featured in one or more of the previously validated models. In countries where necessary data are not yet collected at the bank level, a useful reform would be to impose a better information system on domestic banks. For countries that currently satisfy or

come to meet data-availability requirements for one or more models, parameters can be estimated and tested for reliability by using a sample of loan applications that have been screened and approved at designated banks by their own loan officers. Finally, in countries and banks for which statistical analysis can approve at least one model for transfer to their competitive environment, significant differences in estimates of marginal risks and of the average risks weights attached to different classes of loans can be used by World Bank or BIS analysts in cross-country analyses of asset risks and used by country supervisors as the basis for empirically based country-specific and bank-specific estimates of default probabilities.

When and as they are validated, credit-scoring models provide an empirical method for answering a number of tough supervisory questions. First, for what classes of assets (if any) does it make sense to set low or zero risk weights in a given country or class of countries? Second, how much safer or riskier on average are a bank's claims on a developing country's government and public enterprises than its loans to private enterprises? Third, what minimum ratio of capital to assets may safely be deemed prudent for specific developing countries?

A scoring model can also be thought of as streamlining bank file structures and even automating the loan decision. In this conception, computer software treats information collected in loan applications as survey data and formulates a preliminary estimate of the bank's optimal loan response. Of course, final decision processes must include procedures for varying this response to make use of intuitive information that loan officers develop in ways that are not yet objectively reproducible. In straightforward cases, credit evaluation time may be reduced to a few hours. One U.S. software vendor, Appro Systems in Louisiana, claims that its software can produce a preliminary loan approval-or-denial decision in minutes.

It would be a mistake to dismiss loan-analysis software as too sophisticated for use by developing countries. In some developing countries, automated teller machines (ATMs) and applications of banking software are proliferating rapidly (Kraus, 1992). In fact, Fiserv Inc. has already contracted with four countries in the Northern tier of Latin America (Mexico, Honduras, Colombia, and Venezuela) for Spanish-language versions of its banking software (Sullivan, 1993).

The priority problem lies not in designing futuristic software but in improving the quality of data available for model testing and implementation. By means of touch-screen ATMs and cartoon characters, even illiterate customers can be helped to fill out loan applications electronically. Expert systems constitute a change in technology that lessens rather than increases the skill demands being placed on loan officers and at the same time makes their job performance and instances of corrupt and fraudulent behavior easier for supervisors and examiners to monitor.

Besides tracking changes in risk, evidence of changing default probabilities can also be used to set up a market-based approach for establishing a watchlist and reserving for loan losses. Whether used to automate loan decisions or merely to monitor them, credit-scoring models can be used for timely identification and prompt downward or upward revaluations of problem loans. Updated data on borrower attributes can be used to track the changing probability of default after a loan has been made. While post-loan revaluation is still at an early stage of development, American Management Systems, Inc. has developed what it calls a Strata software system that uses scoring models to predict a customer's disposition to pay back a delinquent loan.

Outside Monitoring of a Bank's Credit Analysis

Credit analysis may be conceived as a management system that conducts statistical and sensitivity analyses of the credit-application database. These analyses have two principal objectives: to calculate applicants' repayment probabilities and to value the lending opportunities being offered to the bank. In every loan made, managers should be able to identify the risks in the deal and how much the bank is being paid for bearing these risks. Each contract must be structured to offer a risk-return combination that makes the probability of repayment and the loan interest rate high enough to promise a reasonable total profit on the loan.

Outside stakeholders need to monitor and second-guess a bank's risk-classification and pricing procedures. Bank examination is a process that looks to test a bank's information and management systems for flaws. The first requirement of effective supervision is access to the data and assumptions from which the bank calculates repayment probabilities and asset values.

Even in G-10 countries, supervisory technology falls far short of technological possibilities. Increasingly, in these countries the data and assumptions an examiner needs

to evaluate will be objectified and "wired" into expert systems and intelligent workstations at individual banks. As we have seen, expert systems now exist that estimate the risk embodied in individual loans. The process of aggregating these estimates into measures of a bank's overall portfolio risk is an exercise in applied portfolio theory that the Basle Agreement has yet to address. The resolution of this aggregation problem, when it is addressed, will turn on being able to estimate the extent of pairwise correlations between returns on individual loans.

Whether or not concentration risk is measured formally, it is reasonable for government examiners to develop their own standardized expert system as a benchmark for analyzing the loan portfolios of individual banks. It is also reasonable for them to seek to co-ordinate and standardize system architecture and information file structure across banks. This is true whether or not the bank being examined yet uses computer software to conduct credit analysis. In developed and developing countries alike, examiners and top bank managements share an interest in automating bank credit files and internal risk analyses at reasonable speed. At a minimum, loan decisions need to be linked specifically to an information file of borrower characteristics and prospects. This file begins with the data would-be borrowers furnish in loan applications, but this database needs to be updated routinely as time passes and loan proceeds are collected or delayed. As a country's banks convert to electronic files, monitoring costs can be minimized if supervisors insist that banks cooperate in designing ways to input their files into "transportable" private credit-rating and government examination systems.

Banks and supervisors in G-10 countries must make progress on these problems before authorities in developing countries can be expected to do much about them. But the systems developing countries adopt today should be made ready to incorporate systemic changes that can be confidently predicted to occur in institutions and countries that are technologically more advanced.

G-10 countries need to set up (and therefore may be expected to establish) three separate but complementary information subsystems. These subsystems would respectively track: (a) the market values of securities that trade in secondary markets; (b) changes in the repayment prospects of loans; and eventually (c) the effects of changes in interest rates and foreign-exchange rates on the value of the institution and its economic income. As they build these subsystems, economic efficiency dictates that the valuation

and risk-analysis software they use be made accessible to bank examiners in different countries and responsive to the dynamics of financial-institution balance sheets.

In the meantime, supervisors in developing countries can usefully be encouraged to develop information systems that are compatible with the PDV methods of bank capital appraisal described in section II. For each of the major portfolio categories a bank's balance sheet and income statements delineate, top managers can be asked under penalty of fraud to project, defend, and discount the range of cash flows they deem likely to accrue.

Concentrating on Identifying and Tracking the Changing Value of Problem Loans

Within the U.S., state and federal regulators share information about the loans and investments that their respective bank examiners classify adversely. International sharing of supervisory information is equally important and already occurs to some extent through the Bank for International Settlements (BIS). The World Bank and BIS should explore opportunities to extend the scope of this information sharing to a broader group of countries.

More generally, the World Bank or BIS might speed up the spread of the needed information systems and coordinate supervisory standards across developing countries in three ways. First, they could become producers of internationally transferable credit-analysis and regulatory information protocols and valuation software. Second, on an international or regional basis, they could serve as forums for negotiating itemization and valuation rules that would use expert software to recognize incipient loss accruals and to assign accruing losses to specific bank stakeholders. Third, they could test and disseminate risk information to help the financial-services industry to set up a global secondary market for developing-country loans. Enhancing the liquidity of these loans would tend to reduce prescriptive levels of capital requirements for banks in developing countries and the cost of capital to customers of these banks.

In the years to come, these institutions could usefully disseminate a range of valuation and credit-analysis models that follow behavioral scoring models in being conceived as methods for analyzing pertinent information reported in credit-application data, credit-bureau or credit-rating files, and payment records. These models should strive to follow U.S. software systems in planning to employ scoring models to predict a customer's disposition to pay back a loan when and as it becomes delinquent. The

resulting scores can be used as a basis both for establishing loss reserves and for fine tuning collection efforts (i.e., "dunning" activity) to the probable responsiveness of various customer subsets.

Timely problem-loan identification turns on tracking the changing probability of default after a loan has been made. In the U.S., software for tracking this probability is evolving out of credit-scoring and debt-collection software. Risk scoring for loan recovery is not fundamentally different from the risk scoring that is undertaken during a bank's initial underwriting process. It is natural for banks to repeatedly re-feed changing economic conditions, legal constraints, and borrower circumstances into the loan scoring framework as each loan moves forward through time. Doing this will ultimately provide an operational way of implementing market-value accounting for bank loans.

IV. Political Embracability: Better Information Systems As a Response to Market Pressures Faced by Regulatory Enterprises

Financial regulation is a service that regulated institutions value for the benefits of confidence and convenience it confers on customers who use their products (Kane, 1988). Regulators do not and cannot autonomously command and control the behavior of the "client" institutions they regulate. Rather, each regulator's panel of control instruments is shaped by prior conditioning and ex post feedback from the parties it regulates (i.e., its "regulatees"). To survive, a control must be voluntarily accepted by regulatees in the long run. Unacceptable controls lead regulatees and their competitors to engage in "regulatory arbitrage" that effectively transfers market share from inefficient regulators. In developing countries, regulatory arbitrage typically shifts business from regulated firms to less-formal underground institutions (Germides, Kessler, and Meghir, 1991) and to offshore entities.

The existence of competing regulatory arrangements supports a long-run voluntariness in regulatory relationships that creates strategic parallels between operating a regulatory agency and operating an ordinary business. To succeed in the long run, even a regulatory enterprise must deliver a quality product at a fair price. Emphasizing this point may help the World Bank and BIS to make the information systems recommended here more palatable to supervisory authorities in developing countries.

The Concept of a Regulator's Price

The equivalent of the price of a regulatory system is the net burden it places on its regulatees. This net burden differs from the "gross burden" of regulation in two ways. First, it subtracts out the benefits in customer confidence and transactional efficiency that the regulatory system confers on its regulatees. Second, it further eliminates whatever cost of operating the regulatory system can be successfully shifted to unwary taxpayers.

As a price, each regulator's net burden responds over time to opportunities for substitution. Competition from differentially regulated institutions and other market forces lead regulated parties to do two things: (1) to push for less-burdensome rules and (2) to adapt their economic strategy and organizational form to reduce the opportunity costs that the regulation would create for their firms if managers were to comply with existing rules mindlessly. For this reason, the cost of inefficient regulation tends over time to shift from costs of strict "compliance" to costs of undertaking efficient regulatory arbitrage. In turn, the cost of regulatory arbitrage is the cost of adapting a regulatee's product line, production and distribution systems, business locations, and corporate structure to make it possible to engage in profitable activities from which the firm would otherwise be excluded.

Net regulatory burdens differ drastically between strong and weak banks. Weak banks receive subsidies from deposit insurance and less-formal government guarantees that strong banks and general taxpayers eventually help to pay for. In the U.S., the net burden on strong banks has been increasing secularly in two respects. First, social-purpose regulation (whose benefits are directed outside the industry) has generated increasing paperwork. Second, regulatory efforts to retard the exit of inefficient and insolvent deposit institutions lower the profit margins that strong firms can earn on borrowed funds and push their deposit-insurance premiums above the value of the guarantee services these low-risk institutions receive.

The counterparts of social-purpose regulation in developing countries are credit allocation policies that directly subsidize loans to preferred sectors and individuals. If applied to weak and strong banks alike, World Bank promulgation of standardized schemes for evaluating bank loans would broaden the market for the equities of banks in developing countries (Cho, 1986) and lessen a government's ability to subsidize inefficient borrowers and crippled institutions in a hidden fashion.

A reasonable immediate goal for coordinated supervision is merely to agree to enforce much higher global net regulatory burdens for weak banks. To achieve this goal, it is enough to make sure that all banks hold positive enterprise-contributed capital without bothering to calibrate a precise risk-weighting scheme to justify variation in the enforcement threshold (Shadow Financial Regulatory Committee, 1989). However, if a risk-weighted threshold is to be adopted, it ought to embrace two additional goals. First, it should seek to measure the net regulatory burden comprehensively and equalize the burden it lays on a nation's strong banks with that of competing financial-services firms. Second, the system should seek to equate the part of the burden each nation's banks are allowed to shift to taxpayers with the benefits of the social-purpose responsibilities that the government specifically asks its banks to shoulder.

One way or another, the law of one price tells us that market pressures on every nation's banks and banking regulators will accomplish both types of equalization in the long run. The question is whether this can be done without first transferring much of domestic banks' financial-market share to foreign firms and other domestic financial institutions. The key to speeding up healthy regulatory and banking market-structure adjustments in any country is to make a crippled bank's economic insolvency and reliance on taxpayer-contributed capital harder to cover up.

Conflicts Between Overt and Covert Goals

Financial regulators make and enforce rules. These rules restrain the activities of individual financial-services firms (FSFs) to generate overt and hidden benefits for various parties in society. Regulators' overt goals may be identified as promoting the stability, efficiency, and fairness of the financial industry. A regulatory enterprise's bureaucratic interest can be proxied by its administrative jurisdiction, the size of its annual budget, or the capitalized value of something akin to the enterprise's net income. Hidden benefits typically originate in unresolved conflicts of interest among regulators (including politicians), regulatees, FSF customers, and ordinary taxpayers. These conflicts of interest generate incentives that explain antiegalitarian redistributive government policies that enrich some politicians, some bureaucrats, and/or some segments of society at the expense of society as a whole.

What society views as poor regulatory outcomes sometimes trace to mistakes by misinformed individual regulators and sometimes to an unsavory pursuit of hidden

agendas. Economic analysis can portray managers of a regulatory enterprise as maximizing the goals set by their overt mission, subject to technological, market, and statutory restraints and to various principal-agent conflicts. Such a model can also treat individual regulatory enterprises in different countries or in different financial-services industries as being locked in competition with one another for whatever measure of value their managers maximize (Scott, 1977). An enterprise's true objectives may embody tradeoffs between the performance of its overt social mission, its covert bureaucratic and political interests, and its managers' reputations and narrow career interests. To align public-service incentives more closely with taxpayer interests, information systems for monitoring banks in developing countries must permit taxpayers to monitor more effectively the long-run burdens their agent regulators actually impose upon them.

Regulatory Arbitrage as a Force for Net-Benefit Convergence

Around the world, financial institutions and markets and concomitant regulatory systems show numerous country-specific features (Wilson, 1986; Germides, Kessler, and Meghir, 1991). Differences in patterns of financial regulation parallel differences in the particular economic, political, and bureaucratic deficiencies and inefficiencies that regulation is overtly or covertly expected to correct.

However, the survival of differences in regulatory patterns is limited by the tendency of private capital and loan-making opportunities to flow to markets and institutions that offer the best deals. The extent to which net regulatory burdens on financial markets and institutions differ across countries is narrowed by this regulatory arbitrage. When and as technological change in information processing and telecommunications lowers the cost of transacting with foreign entities, adverse flows of capital and financial deals should help to persuade a nation's authorities to lower the net burdens their regulatory framework imposes on the savers, investors, and financial intermediaries that transact in its financial markets.

Recognition that exploitive regulation drives depositors, borrowers, and other bank stakeholders to book their business in foreign and less regulated or informal domestic markets limits the extent to which a country can set short-run burdens that deviate from its society's optimal long-run path. For any country, the size of efficient deviations increases with the opportunity costs its citizens would face in engaging in capital flight. These costs evolve with information costs, the volatility of the real

economy, and the fluidity of the political environment. This knowledge should help the World Bank to convince authorities in developing countries that the information revolution that is underway in finance today makes it short-sighted and unfair to adopt policies that intentionally or unintentionally permanently subsidize weak banks.

REFERENCES

- Altman, Edward, Robert Avery, Robert Eisenbeis, and Joseph Sinkey, 1981. Application of Classification Techniques in Business. Banking and Finance, Greenwich, Conn.: JAI Press.
- Berger, Allen, K K. King, and J.M. O'Brien, 1991. "The Limitations of Market Value Accounting and a More Realistic Alternative," Journal of Banking and Finance, 15 (September), pp. 753-783.
- Boyes, William, Dennis Hoffman, and Stuart Low, 1989. "An Econometric Analysis of the Bank Credit Scoring Problem," Journal of Econometrics, 40, pp. 3-14.
- Brock, Philip E. (ed.), 1992. If Texas Were Chile: A Primer on Banking Reform. San Francisco: ICS Press.
- Chesser, D.L., 1974. "Predicting Loan Noncompliance," Journal of Commercial Bank Lending, 56, pp. 28-38.
- Chhikara, Raj, 1989. "The State of the Art in Credit Evaluation," American Journal of Agricultural Economics (December), pp. 1138-1144.
- Cho, Yoon Je, 1986. "Inefficiencies from Financial Liberalization in the Absence of Well-Functioning Equity Markets," Journal of Money, Credit, and Banking, 18 (May), pp. 191-199.
- Corrigan, E. Gerald, 1992. "Challenges Facing the International Community of Bank Supervisors," Quarterly Review, Federal Reserve Bank of New York, 17 (Autumn), pp. 1-9.
- Demirgüç-Kunt, Asli, 1992. "Creditor Country Regulations and Commercial Bank Lending to Developing Countries." Washington: The World Bank.

- Demirgüç-Kunt, Asli, and Harry Huizenga, 1992. "Barriers to Portfolio Investments in Emerging Stock Markets," Washington: The World Bank.
- Eisenbeis, Robert A., 1992. "Seminar on Banking Reform in Chile," Aide-Memoire Prepared for the Inter-American Development Bank (Nov. 30).
- Germides, Dimitri, Dennis Kessler, and Rachel Meghir, 1991. Financial Systems and Development: What Role for the Formal and Informal Financial Sectors?, Development Centre Studies, Paris: OECD.
- Gutierrez, Joaquin, Vincent Polizatto, David Scott, Andrew Sheng, and Samuel Talley, 1991. "Bank Supervision: Suggested Guidelines --Models of Bank Supervision," Washington: The World Bank, Financial Policy and Systems Division.
- _____, 1992. "Bank Supervision Guidelines: Capital Adequacy," Washington: The World Bank, Financial Policy and Systems Division.
- Hall, Maximilian J.B., 1990. "Officially Imposed Impediments to a Level Playing Field in International Banking: A Comparative Study of the UK, US, and Japanese Approaches Adopted Towards the Implementation of the BIS 'Rule' on Capital Adequacy Assessment." (Nuffield University, unpublished).
- Kane, Edward J., 1985. The Gathering Crisis in Federal Deposit Insurance. Cambridge, MA: MIT Press.
- _____, 1988. "How Market Forces Influence the Structure of Financial Regulation," in W. Haraf and R.M. Kushmeider (ed.), Restructuring Banking and Financial Services in America, Washington: American Enterprise Institute for Public Policy Research, pp. 342-382.
- Kraus, James R., 1992. "Developing Nations Offer a Hot Market," American Banker (December 22).
- Mayer, Martin, 1993. "Testimony," U.S. Senate Committee in Banking, Housing, and Urban Affairs, The State of the Banking Industry and the Bank Insurance Fund. Hearings (June 9-10 and 17, 1992; July 29, 1992; October 26, 1992), Washington: Government Printing Office, pp. 809-817.
- Polizatto, Vincent P., 1990. "Prudential Regulation and Banking Supervision: Building an Institutional Framework for Banks," Policy, Planning, and Research Working Paper, Washington: The World Bank.
- Schuyer, Jan, 1992. Banks Under Stress. Paris: OECD.

- Scott, David H., 1992. "Revising Financial Sector Policy in Transitional Socialist Economies: Will Universal Banks Prove Viable?," Policy Research Working Paper Series 1034, Washington, D.C.: World Bank (Nov.).
- Scott, Kenneth, 1977. "The Dual Banking System: A Model of Competition in Regulation," Stanford Law Review, pp. 1-50.
- Shadow Financial Regulatory Committee, 1989. "An Outline of a Program for Deposit Insurance and Regulatory Reform," Statement No. 41, reprinted in Journal of Financial Services Research 6 (August 1991, Supplement), pp. S-78 to S-82.
- Singleton, J. Clay, and Alvin J. Surkan, 1991. "Modeling the Judgement of Bond Rating Agencies: Artificial Intelligence Applied to Finance," Journal of the Midwest Financial Association, 20, pp. 72-80.
- Sinkey, Joseph F., Jr., 1992. Commercial Bank Management in the Financial-Services Industry (Fourth Edition), New York: Macmillan Publishing Co.
- Sullivan, Deidre, 1993. "Fiserv Selling Software to Two Latin Banks," American Banker (July 19), p. 3.
- Talley, Samuel H., and Ignacio Mas, 1990. "Deposit Insurance in Developing Countries," Policy, Research and External Affairs Working Paper Series No. 54, Washington: The World Bank.
- Wilson, J.A.G., 1986. Banking Policy and Structure: A Comparative Analysis. New York: New York University Press.
- Zeller, Stephen H., 1993. "Portfolio Risk: A Structural Approach," Andover, PA: Expert Economics (unpublished).
- _____, 1993. "On Linking Industry-Specific Risk Measures to Macroeconomic Events: An Example of Business Failure Rates in the Manufacturing," Andover, PA: Expert Economics (unpublished).

Policy Research Working Paper Series

	Title	Author	Date	Contact for paper
WPS1221	Does Research and Development Contribute to Economic Growth in Developing Countries?	Nancy Birdsall Changyong Rhee	November 1993	S. Rajan 33747
WPS1222	Trade Reform in Ten Sub-Saharan Countries: Achievements and Failures	Faezeh Foroutan	November 1993	S. Fallon 38009
WPS1223	How Robust Is a Poverty Profile?	Martin Ravallion Benu Bidani	November 1993	P. Cook 33902
WPS1224	Devaluation in Low-Inflation Economies	Miguel A. Kiguel Nita Ghei	November 1993	R. Luz 39059
WPS1225	Intra-Sub-Saharan African Trade: Is It Too Little?	Faezeh Foroutan Lant Pritchett	November 1993	S. Fallon 38009
WPS1226	Forecasting Volatility in Commodity Markets	Kenneth F. Kroner Devin P. Kneafsey Stijn Claessens	November 1993	F. Hatab 35835
WPS1227	Designing Water Institutions: Market Failures and Institutional Response	Marie Leigh Livingston	December 1993	C. Spooner 30464
WPS1228	Competition, Competition Policy, and the GATT	Bernard M. Hoekman Petros C. Mavroidis	December 1993	L. O'Connor 37009
WPS1229	The Structure, Regulation, and Performance of Pension Funds in Nine Industrial Countries	E. P. Davis	December 1993	P. Infante 37642
WPS1230	Unemployment in Mexico: Its Characteristics and Determinants	Ana Revenga Michelle Riboud	December 1993	R. Stephen 37040
WPS1231	Making a Market: Mass Privatization in the Czech and Slovak Republics	Nemat Shafik	December 1993	A. Correa 38549
WPS1232	Will GATT Enforcement Control Antidumping?	J. Michael Finger K. C. Fung	December 1993	N. Artis 37947
WPS1233	Hedging Cotton Price Risk in Francophone African Countries	Sudhakar Satyanarayan Elton Thigpen Panos Varangis	December 1993	D. Gustafson 33714
WPS1234	Price Formation, Nominal Anchors, and Stabilization Policies in Hungary: An Empirical Analysis	Andrés Solimano David E. Yuravlivker	December 1993	S. Florez 39075

Policy Research Working Paper Series

	Title	Author	Date	Contact for paper
WPS1235	Eastern Europe's Experience with Banking Reform: Is There a Role for Banks in the Transition?	Alfredo Thorne	December 1993	N. Jose 33688
WPS1236	The Impact of Two-Tier Producer and Consumer Food Pricing in India	Maurice Schiff	December 1993	S. Fallon 38009
WPS1237	Bank Performance and the Impact of Financial Restructuring in a Macroeconomic Framework: A New Application	Yavuz Boray Hector Sierra	December 1993	C. Lim 30864
WPS1238	Kenya: Structural Adjustment in the 1980s	Gurushri Swamy	January 1994	V. Saldanha 35742
WPS1239	Principles of Regulatory Policy Design	David E. M. Sappington	January 1994	WDR 31393
WPS1240	Financing the Storm: Macroeconomic Crisis in Russia, 1992-93	William Easterly Paulo Vieira da Cunha	January 1994	R. Martin 39026
WPS1241	Regulation, Institutions, and Commitment in the British Telecommunications Sector	Pablo T. Spiller Ingo Vogelsang	January 1994	B. Moore 35261
WPS1242	Financial Policies in Socialist Countries in Transition	Boris Pleskovic	January 1994	M. Jandu 33103
WPS1243	Are Institutional Investors an Important Source of Portfolio Investment in Emerging Markets?	Punam Chuhan	January 1994	R. Vo 31047
WPS1244	Difficulties of Transferring Risk-Based Capital Requirements to Developing Countries	Edward J. Kane	January 1994	P. Sintim-Aboagye 38526